

Professor Lincoln (630) 840-5218 LUCIFER@FNAL.GOV (most effective)

**Course Description:** Topics include heat and thermodynamics, electricity and magnetism and wave optics. There is a laboratory component.

**Required Text:** *College Physics*, 5<sup>th</sup> edition, by Serway and Faughn and North Central College Physics Department Laboratory Manual.

**Homework:** Homework is likely to be a large portion of your grade. Each assignment missed will reduce your class grade by approximately three percentage points. You will be given a list of assignments that you are expected to be able to do. These problems will be collected for grading according to the attached schedule and are due at the beginning of class. You are encouraged to work together if necessary, but you must be certain that you are able to do the work on your own. Problems that are similar to those given in the homework will be used for part of the exams. Homework solutions will be posted in the physics department. While in general it is the student's responsibility to get the solutions and understand them, I will go over selected problems in class if requested. This will occur at the beginning of each class.

Homework can be done on any kind of paper (8.5" x 11"). If you use spiral notebook paper, you must trim the left-hand side of the paper. (No frizzies!) Write only on one side of the paper, and staple them in the upper left-hand corner. **Unstapled homework assignments will be docked 30%.** The problems should be turned in order. If you do not work the problems in order, you should leave enough space for the ones you are skipping, or simply insert extra pages. The work should be done as neatly as you can. I will not assume that you are brilliant simply because I can't read your writing.

I will grade selected problems from each homework set, but I will not announce in advance which problems will be graded, thus you should do them all. Some weeks I will grade them all.

**Late Homework Policy:** Late homework is, in general, not accepted. However, each student is allowed to turn in *one* assignment late. It must be turned in no later than the beginning of the class following the class on which the assignment is due. **NO** credit will be given for late homework beyond this one. I recommend that you use this 'freebie' for a time in the quarter when you have multiple tests or for similar circumstances.

**Attendance Policy:** Students attendance is a very strong predictor of one's understanding of the subject and, ultimately, one's final grade. Consequently, students are expected to attend each class. Students with more than three absences may be dropped from the class. Students are expected to attend all laboratory sessions. Your class grade will drop by two percentage points for each laboratory session that you miss, even if you turn in a lab report. **If you do not turn in a lab report this penalty will be in addition to the effect the missing lab report has on your grade.**

**Examination Policy:** There will be three exams given during the class, one approximately every 2-3 weeks. These exams will be weighted equally and should take about one hour each. **[The lowest exam grade will be dropped when calculating your final grade. This is for system 1 (see below). For system 2, all tests count.]** Under no circumstances will make-up exams be given. If you miss an exam, this grade is the one that will be dropped. There will be a comprehensive final exam. Chapter 24 will be tested only on the final.

**Laboratory:** Each week a lab will be done. The lab time will generally be scheduled to occur during the Monday class. There will be some time on the Wednesday class to finish data acquisition and to polish your write-up. Labs are due before you leave on the Wednesday following the data acquisition period and will be returned on the following Monday. Student participation in the data-taking activities will be noted and will also be reflected in the lab-writeup grade.

**Grading:** Grades follow the normal scale (90/A, 80/B, 70/C, 60/D). This quarter, I am trying an experiment in how grades are assigned. I will use two different possible weighting systems. They are:

Weighting System	1	2
Homework	30%	0%
Tests	30%	60%
Lab	15%	15%
Final	25%	25%
	Drop 1 Test	Drop 0 Tests

You must choose one of these systems on the first day of class. **Under ABSOLUTELY NO circumstances will I change your choice.** I recommend that you choose system 1, as that is the one that has been used in previous years. It is also my experience that people who don't do the homework fail the class badly.

**Office Hours:** As an adjunct professor, I am rarely on campus. I will usually be on campus for about one hour before class, although this is not universal and will be somewhat unpredictable. I can be contacted both by phone and email. You may talk to me to schedule some time before or after class. In addition, Drs. Liaw or Horner can be contacted for assistance throughout the day. Contact them for availability.

**Drop/Add Policy:** In the unfortunate situation of poor class performance, it is the responsibility of the student to drop the class by the deadline. It is the student's responsibility to find out when these deadlines are. I will **NOT** drop a student late in the quarter in order to rescue your GPA.

# Class Schedule

Week	Topic	Homework Problems
1 Jan 3	0 <sup>th</sup> Law of Thermodynamics, thermometers, expansion of liquids and solids, ideal gasses, mechanical equivalent of heat, specific heat  Lab: Thermal Expansion of Metals	Chapter 10 1-5 Q 10,13 P 8,18,24,26,30  Chapter 11 1-2 Q 5 P 2,4,6,8 (Due Jan 10)
2 Jan 8 Jan 10	Conservation of energy, latent heat and phase changes, conduction, convection, radiation, insulation, metabolism, heat, work, first law of thermodynamics, reversible and irreversible processes  Lab: Electrical Equivalent of Heat	Chapter 11 3-9 Q 12,14 P 14,18,22,26,36,37  Chapter 12 1-5 Q 10 P 8,14,16,20 (Due Jan 17)
3 Jan 15 Jan 17	Coulomb's Law; quantization of charge; conservation of charge, introduction to electric field: a) lines of force, b) electric field of a point charge  Lab: Electric Charge	Chapter 15 1-6 Q 10,12,18 P 2,6,10,14,16,20,26,28,32, 47 (Due Jan 24)
4 Jan 22 Jan 24	A point charge in an electrical field, electric field due to point charges, electric potential, electric potential energy, and electric potential due to point charges  Exam 1 [Chapters 10-12] (January 22)	Chapter 16 1-5 Q 2,4,5 P 2,3,4,6,9,10,12,14,16,18 (Due Jan 31)
5 Jan 29 Jan 31	Introduction to capacitors, capacitors in series, capacitors in parallel, energy storage in capacitors  Lab: Pasco Electrical 1-3	Chapter 16 6-10 Q 8,14,18 P 22,24,28,31,32,34,40,42, 44,45 (Due Feb 7)
6 Feb 5 Feb 7	Electric current and drift velocity, Ohm's Law, resistivity and resistance, electrical energy and power, resistors in series, resistors in parallel  Lab: Pasco Electrical 4-6	Chapter 17 1-4 Q 2,6 P 2,6,8,10,16  Chapter 18 1-3 Q 11,12 P 2,4,8,11,14 (Due Feb 14)
7 Feb 12 Feb 14	Lorentz Force Law, magnetic force on a current, torque on a current loop, the Hall Effect, cyclotrons and synchrotrons  Exam 2 [Chapters 15, 16] (February 12) Lab: DC	Chapter 19 1-5,7 Q 1,4 P 2,3,6,12,14,18,20,23,30, 32 (Due Feb 21)

8 Feb 19 Feb 21	Magnetic field near a long straight wire, magnetic field of a current loop, two parallel conductors, magnetic field of a solenoid  Lab: Current in Wire	Chapter 19 8-10 Q 15,18 P 36,38,39,40,42  Chapter 20 1-5 Q 4,6 P 4,6,10,18,25,26 (Due Feb 28)
9 Feb 26 Feb 28	Wave Optics, nature of light, diffraction, interference and thin films  Lab: Double Slit	Chapter 24 1-6 Q 2,8,10 P 2,4,8,4,16,26,27,28, 32 (Due Mar 7)
10 Mar 5 Mar 7	Review for Final  Exam 3 [Chapters 17-20] (March 5)	
11 Mar 12	<b>Final Exam</b> (probably during normal class hours, TBD)	

# Calendar

## Monday

## Wednesday

		Jan 3 Lecture 10-11	
Jan 8 Lecture 10-11	Lab 1 (Expansion)	Jan 10 Lecture Chapter 11-12	<b>HW 1</b> <b>Lab 1</b>
Jan 15 Lecture 11-12	Lab 2 (Heat)	Jan 17 Lecture Chapter 15	<b>HW 2</b> <b>Lab 2</b>
Jan 22 <b>Exam 1</b> (Chapter 10-12)	Lab 3 (Charge)	Jan 24 Lecture Chapter 16a	<b>HW 3</b> <b>Lab 3</b>
Jan 29 Lecture 16a		Jan 31 Lecture 16b	<b>HW 4</b>
Feb 5 Lecture 16b	Lab 4 (Pasco 1)	Feb 7 Lecture Chapter 17-18	<b>HW 5</b> <b>Lab 4</b>
Feb 12 <b>Exam 2</b> (Chapter 15-16)	Lab 5 (Pasco 2)	Feb 14 Lecture Chapter 19a	<b>HW 6</b> <b>Lab 5</b>
Feb 19 Lecture Chapter 19a	Lab 6 (DC)	Feb 21 Lecture Chapter 19b-20	<b>HW 7</b> <b>Lab 6</b>
Feb 26 Lecture Chapter 19b-20	Lab 7 (Current)	Feb 28 Lecture Chapter 24	<b>HW 8</b> <b>Lab 7</b>
Mar 5 <b>Exam 3</b> (Chapter 17-20)	Lab 8 (2 Slit)	Mar 7 Review	<b>HW 9</b> <b>Lab 9</b>
Mar 12 <b>Final</b> (Chapter 10-12, 15-20, 24)			